The following paper was published in:
Heidelberger, Michael, Friedrich Stdler (eds.): Wissenschaftsphilosophie und Politik. Philosophy of Science and Politics. (= Veröffentlichungen des Instituts Wiener Kreis, Vol.11) Wien New York: Springer 2003

Philosophy of Science and Democracy.
Some reflections on Philipp Frank's *Relativity – a richer truth.*

Philipp Frank's book *Relativity – a richer truth*[1] shows something we do not find very often after World War 2: a philosopher of science acting as a public intellectual. Taking part in the *Conference on Science, Philosophy and Religion,* Philipp Frank intervened in the public debate about the causes of Nazism and how to defend democracy and liberalism against totalitarian ideas and politics. Could philosophy of science contribute to such a struggle? Philipp Frank thought it could, he even thought that Philosophy of Science should play a crucial role in it. It's obvious that this position should be of some interest for philosophers in Austria and Europe today.

Of course, any serious analysis of Frank's position would have to take the whole historical constellation into account. Between the beginning of the conference in 1940 and the publication of the book in 1951 the historical situation had dramatically changed. And therefore one has to distinguish several political dimensions in Frank's arguments. Let me just make a short remark on the plurality of political perspectives Frank's discourse opened up. Philipp Frank defined the role science should play in democracy not only in contrast to the role of science as it was conceived by totalitarian governments. Of course he criticised the Nazis' and Soviets' "philosophies of science" several times (see for instance p. 73, 98, 103p.). But he also made very clear that in the 40ies and 50ies not even the majority of scholars and university teachers in the US supported the specific view of science which Frank thought was so important to the advancement of democracy (for instance 59pp.). His rather critical comments on the teaching of science in the post war / cold war period show what he thought the really important political impact of science was. As far as I can see, these comments did not loose their significance.

Though at the beginning of the 21st century democracy has become the widely accepted guiding model of political organisation, the development of the really existing democracies in "Pan-Europe"[2] during the last decades has not been a true success story. In the US today not even half of the population use their right to vote. Also in Europe the interest people take in

1 Philipp Frank 1951 (References without further indications refer to this book.)
2 I am using this term in the sense of Wallerstein 2000.

electing their political representatives has declined, and right wing parties with racist and authoritarian ideologies gain high percentages of votes. In Austria, the FPOE – notorious for its racist and nationalist rhetoric – was even helped into governmental power. We have to acknowledge that the advancements science made since 1945 did not bring about similar advancements in regard of the political standards of western democracies - not to mention social standards.[3] So – what was Philipp Frank talking about? Was he wrong when he believed that science and philosophy of science could play a major part in building up a more democratic and liberal society? I rather believe that Frank's view of how science could contribute to the building up of higher political and social standards, has not been realised, it has been lost or forgotten during the second half of the 20th century. And I believe it would be worthwhile to reconsider the conception of which Philipp Frank tried to convince his contemporaries. Such a reconsideration might even help us to get a more complex and lively image of what at stake is in the struggle for a more democratic society.

The starting point of Frank's reflections on the social and political role of science and philosophy of science was the accusation, raised by "*churchmen, educationists, social workers, philosophers and historians*", that science was at least indirectly responsible for the breakdown of military and political morale in 1940's western Europe. They thought that this breakdown had its deeper roots in agnostic and sceptical attitudes and a disbelief in absolute values . "This 'relativism' … was frequently regarded as an effect of the allegedly exaggerated role science had played in modern thinking". (p.11)

What was Frank's strategy in answering this reproach? First of all he confirmed its main assumption. Yes indeed, he argued: science questions all absolute knowledge claims and therefore in principle weakens the willingness to believe in absolute values. But disbelief in absolute values does not mean disbelief in the objectivity of values. In order to demonstrate that science might even strengthen the belief in the objectivity of values, Frank first gave a certain account of science and the advancement of science. And second he showed how science is embedded in society as a set of social practices and how it contributes (or could contribute) to the advancement of liberalism and democracy. There is an intrinsic relation between Frank's account of science and how he conceived its embeddedness in society as a whole. The concept of objectivity plays a crucial role in this setting.

Philipp Frank on objectivity

3 See Immanuel Wallerstein's diagnosis of Europe's development after 1945 in: Wallerstein 2000.

Frank's main point was that the procedures which "relativise" the truth of a statement (in demonstrating that its truth depends on a certain frame of reference) do not lead to subjectivism and arbitrariness. On the contrary: they constitute scientific objectivity.

"... the so-called 'relativism' is a method which has been instrumental in the progress of human knowledge ... where the real battle for the progress of knowledge has been fought, this battle has proceeded under the very guidance of the doctrine of the 'relativity of truth'." (p.20)

To explain this view to a broad audience, Frank gave a very simple and well-known example: "the relativistic attitude of Copernicus". When the existence of the antipodes was discovered, Frank argued, the meaning of the words "above" and "below" was "relativised". Statements which had been perfectly clear and evident before, lost their definite meaning. Since then, they have to be qualified. The statement "my head is over my feet" has to be specified by addition of the expression "relative to the gravity at a specifically described framework". Without this qualification, statements using the words 'above' and 'below' are incomplete.

"We are faced by the same situation as if we would be asked to decide whether the statement 'this table is gr ...' is true, in which 'gr...' may mean 'green' or 'greasy' or 'great'. If I refuse to pass a definite judgement about the correctness of such a statement I do not evade the decision but I ask for a clarification or completion of the statement itself. When the statement is completed, e.g. by the addition of the expression 'relative to the gravity at my place', I shall give the very definite answers: 'My head is certainly above my feet' and 'The head of my antipode is certainly below his feet.' If I complete the statement differently, e.g. by the addition 'relative to the gravity at the place of my antipode' the answer sounds different but as certain as before. Both answers are 'absolutely' – or better, dependably – true." (p.24)

From a philosophical point of view, Frank argued, advancements of science are based on advances in semantics, i.e. the "theory of meaning" (p.37). New experiences which do not fit into the framework of our established concepts, force us to think explicitly about the relation between those concepts and their frame of reference. From that moment on, statements which use certain expressions without referring them explicitly to their framework, are not clear. Since then, they have to be completed. And to complete them, we need a new, a richer language which allows us to construct a new conceptual framework in order describe how two different answers to the same question might be "'absolutely' – or better, dependably – true".

"We always use words and propositions which most adequately and simply describe our actual experience. When new facts are discovered the language that used to describe our former poorer stock of facts becomes now too poor to describe our newly required wealth of knowledge. We have to enrich our language by the procedure of ‚qualification' or ‚relativisation' which was just described by our example of ‚up' and ‚down'. Using this new ‚relativised' language we can give an ‚objective' description of our new stock of facts in the same sense as we formerly, by using poorer language, could give an adequate description of

our earlier poorer stock of experience." (p 25)

Increasing objectivity (in science and in every day life) is attained by creating a "relativised" language which is capable of describing a "new stock of facts". Increasing objectivity also means increasing insight into how the truth of our statements is depending on the framework we are referring to. Therefore

"... even Einstein's celebrated relativity has nothing to do with any brand of 'subjectivism' or 'scepticism', and still less with a despair of the human mind to explore 'the truth'.
Just the opposite is true. 'Relativism' means the introduction of a richer language which allows us to meet adequately the requirements of an enriched experience. We now are able to cover these new facts by plain and direct words and to come one step nearer to what one may call the 'plain truth about the universe'." (p.30)

This is the basic structure of Frank's argument. He explicated it with the help of some very well known doctrines: holism, operationalism and pragmatism suggest different, but related methods for explicating the framework of our concepts and statements. We do not have to go here into Frank's arguments referring to Bridgeman, Peirce and James (see especially the chapters 5 to 7). Only *en passant* I want to point at the historical fact that in Frank's view (as he expressed it in 1951), Logical Empiricism was to be characterised as a thoroughly holistic conception of knowledge:

"According to the Logical Empiricists ‚meaningfulness' is a property of a system of statements or principles. We may also say that the ‚meaningfulness' is a property of a doctrine. An isolated word or even an isolated statement has meaning only indirectly. We call it ‚meaningful' if it is fit to be a part of a meaningful system or doctrine.
This formulation is particularly important if we have to judge the meaning of words and statements used in fields like ethics, politics or religion." (p.40)

This last point is especially important in our context: Frank argued that not only in science "[m]ore and more concepts have been provided with the specification 'relative to a certain system of reference'." Advances in religion, ethics and politics follow the same logic of "increasing relativisation": "also liberal Christianity and reform Judaism are offsprings of the 'relativity of truth'." Frank quotes the liberal preacher Theodore Parker who pointed out "that the 'creeds' and 'rites' of Christianity are accepted even by the worst criminals if no operational meaning is attached to these 'creeds' and 'rites'." (p.45) From this point of view truth claims which at the first stance seem to be very strong (since they are so called "absolute" claims) turn out to be much weaker than claims which are defined by their practical consequences. And when we analyse the structure of moral judgements we can see, that even seemingly absolute moral statements, "derived from obedience to God's will" (as

for instance the general rule ”you must not kill”), are incomplete without a specifically described framework: ”Is it ‘killing’ to assassinate this tyrant?” (p.50) Also moral statements need some ”qualification”. (88pp.)

Ernst Cassirer on objectivity

At this point I would like to hint very shortly at some remarkable intersections between Frank’s views and Ernst Cassirer’s. Let me give an extremely rough sketch of related views in Cassirer’s early philosophy of science (1906, 1910).[4]

1. The modern concept of knowledge breaks with any ‘absolute” knowledge claims (held in every day life as in metaphysics).

   ”Here [i.e. in the critically clarified conception of the opposition of the subjective and the objective] we do not measure presentations with respect to absolute objects; but different partial expressions of the same total experience serve as standards of measurement reciprocally for each other.” (SF 277)

2. It is one of the crucial insights of modern philosophy, that all our cognitive activity is based on our capacity of constructing systems of symbols. (SF 149, 281/282, 284)
3. The kernel of the modern notion of reality is ”the logical differentiation of the empirical contents and their classification within a structured system of dependencies.” (SF 280) The modern concept of knowledge is holistic: ”... each partial experience is accordingly examined as to what it means in the total system; and this meaning determines its degree of objectivity." (SF 277)
4. Empirical knowledge is structured by ”circles of objectivity”. These circles are formed and built up in a process of objectivation. (SF 291) Any step of objectivation articulates some implicit assumption, some aspect of the framework which had not been explicit up to that point.

Both, Frank and Cassirer, conceived of objectivity as ”objectivity by degrees” (275, 277).[5]

To sum up these early views: Following Cassirer, the only consistent philosophical account of modern science is anti-correspondentist. In good kantian tradition, he argued that there is ”no higher objectivity than that which is given in experience itself and according its conditions” (SF 277) From this point of view, the question whether experience in its totality is objective,

4 Cassirers *Substanzbegriff und Funktionsbegriff* of 1910 will be cited following the 1953 English edition (abbreviated SF). In the case of the first volume of *Das Erkenntnisproblem*, 1906, I refer to the German edition of 1994.

5 Helen E.Longino used this expression to characterize her very ambitious feminist approach to philosophy of science (Longino 1990, 76pp.) Thanks to Don Howard for this hint. Catherine Z.Elgin 1997, holds related views; see especially “The Relativity of Fact and the Objectivity of Value” in Elgin 1997, pp. 176-191.

turns out to be senseless. In fact, this question is based on ”a logical illusion” of the same type as the question, what the ”absolute place of the world” might be. (SF 277) But by developing this holistic and anti-correspondentist line of thought, Cassirer argued, science and its philosophy also produced a specific problem which seemed to be unsolvable without recurring to metaphysics, namely the problem how the process of objectivation itself and its principles can be justified. In *The Problem of Knowledge* Cassirer presents Descartes as the most important example of a modern philosopher whose work incorporates both: the modern idea of ”degrees of objectivity” and the modern uneasiness regarding the question how to conceive of the base of the objectivation process itself.[6] Note that Cassirer - though he criticised Descartes for having fallen back into metaphysics - nevertheless held that Descartes put forward a legitimate, even unavoidable philosophical question.[7]

When Cassirer introduced the concept of ”symbolic forms” in the 1920s, he proposed a framework in which the question of the foundation of empirical knowledge in its totality could be asked without leading into metaphysics. Again very roughly some features of the framework suggested in the *Philosophy of Symbolic Forms*:[8]

1. It’s not only in science that we find procedures of objectivation. There is a plurality of ”modes of ‘objectivization’: i.e., ... means of raising the particular to the level of the universally valid; ... they achieve this universal validity by methods entirely different from the logical concept and the logical law.”(PSF 78)
2. Every “mode of ‘objectivization’” - Cassirer names language, myth, art and religion (PSF 80) - articulates and develops a specific symbolic form.
3. Each of them constructs reality as a whole. Therefore the philosophical account of any symbolic form has to be ”holistic”. (PSF 94-98)
4. Every symbolic form tends to produce its own ”absolutism”: each of them is inclined to misunderstand its specific way of totalising the world as founded in the order of things themselves:

   “... in the course of its development every basic cultural form tends to represent itself not as a part but as a whole, laying claim to an absolute and not merely relative validity ... From this striving to an absolute inherent in each special sphere arise the conflicts of culture and antinomies within the concept of culture.”(PSF 81)

By introducing the concept of symbolic forms Cassirer radicalised and enlarged the critique of absolute claims: “As long as philosophical thought limits itself to analysis of *pure*

6 Cassirer analyses Descartes’ turn to a metaphysical solution in: *Das Erkenntnisproblem* Volume I, pp.481-483, 493-498
7 ibid. p.483
8 *The Philosophy of Symbolic Forms*, English translation 1953 (abbreviated PSF).

cognition, the naive-realistic view of the world cannot be wholly discredited."(PSF 80) Now those absolute claims have to be criticized in any field of cultural production. By this enlargement Cassirer in a certain sense "relativised" the scientific world conception. But we have to look carefully at what "relativising" means in this context. I think that Philipp Frank's use of this term can help us to see more clearly what Cassirer's point was: his conception of symbolic forms suggested a framework which enables us to "complete" our philosophical thinking about objectivity. Remember Frank's example: since the antipodes were discovered, the terms "above" and "below" have lost their definite meaning. Since then, sentences using these terms have to be completed by adding the expression 'relative to the gravity at a specifically described framework'. In a similar way Cassirer wants us to qualify sentences which use the term "objective" without specification, as being "incomplete sentences". He wants us to complete them by specifying the way of objectivation: "objectivized by language", "objectivized by myth", "objectivized by science". I am aware that this analogy works only to a certain degree. The point I want to emphasize here is the following: using Frank's concept of "relativisation" we can interprete the introduction of the concept of symbolic forms as the introduction of a richer philosophical language which enabled Cassirer to conceive of scientific objectivity as a specific contribution to the pluridimensional project of objectivation. Far from leading to an anti-scientist skepticism, this "relativisation" of science was intended to give a framework in which the question of the foundation of empirical knowledge as a whole can be asked without leading into metaphysics. This framework enables the philosopher to describe the procedures and achievements of scientific objectivity in its multiple relations to the objectivations attained by language, myth, art, religion, technics, ethics.... without levelling and dedifferentiating the claim to validity in their specific domains.

Philipp Frank on Science and Democracy

Let's come back to Philipp Frank and his view of how science can contribute to the advancement of democracy and liberalism. Note that also Frank felt that science and the procedures by which scientific knowledge is attained have to be justified within a framework which relates science to other cultural and social practices.
The answer he gave to his question focuses on two points:
1. Science produces intellectual instruments of critique and critical attitudes towards any absolute claims and therefore helps people to strive against authoritarian and totalitarian ideas and politics.(96 pp.) One of Frank's examples was the inconsistent use of the distinction

between ”Aryans” and ”Non-Aryans” by the Nazi-Regime.[9]

2. Science can serve as a model of social and political advancement.

”Every advance towards liberalism in government as well as in society and religion has been connected with the advance of semantics. Traditional slogans, no longer accepted in their original meaning, were investigated for their effect on human behaviour, on human happiness and on human suffering. This means that they were more and more interpreted according to the pragmatic and operational conception of meaning.”(Frank 1951, p.44)

The first point stresses the critical force which scientific attitudes produced under authoritarian and totalitarian conditions. (In this respect Frank followed the same line of argumentation as John Dewey, Ernest Nagel and Robert Merton.)[10]
Also the second point emphasizes the critical examination of traditional concepts. In this context however, Frank looked at it from a different point of view: the examination of concepts plays an important part in ”every advance towards liberalism”. Hence, not only science has the capacity to produce the skills and attitudes which make ”advances of semantics” possible. Science and philosophy of science are rather taking part in a much broader project of advancement. In this context, Philipp Frank’s affinity to Cassirer is the most obvious. Cassirer reconstructed procedures of gradual objectivation not only within science but also in other cultural domains.

“Even the religious consciousness - convinced as it is of the ‘reality’, the truth, of its object - transforms this reality into a simple material existence only at the lowest level, the level of purely mythological thinking. At higher levels of contemplation it is more or less clearly aware that it only possesses its object in a special way.” (PSF 80)

And Cassirer conceived of objectivity as the “common project” of the different directions of cultural activity.

“Thus, with all their inner diversity, the various products of culture - language, scientific knowledge, art, religion - become parts of a single great problem-complex: they become multiple efforts, all directed toward the goal of transforming the passive world of mere impressions, in which the spirit seems to be imprisoned, into a world that is pure expression of the human spirit.” (PSF 80p.)

Being one of these multiple cultural efforts, science can nevertheless serve as a model of that broader project, since some of the features which are essential to the common project, have been analysed and made explicit within science. Therefore, viewed from Frank’s and Cassirer’s angle, science is not the shining example or the avant-garde of culture or liberal democracy. It is a sphere of social practice in which some characteristics of the cultural project modern societies are involved in, become more clearly visible than in other spheres of social practice. Being one type of ”advancing social practice” science demonstrates that some

9 See Thomas E.Uebel’s contribution to this volume.
10 See Alan Richardson’s contribution to this volume.

of its most important achievements were attained by questioning the basic, apparently necessary assumptions of the up to then established scientific practice itself, and hence replacing them by more complex ones. It is this specific experience of successful analysis and ”relativisation” of seemingly absolute concepts within its own practice, what science is able to contribute to the broader project of social, political and cultural progress. By making explicit those “relativising” procedures, scientists can be involved in the multidimensional and, as Cassirer stressed, endless process of defining what that progressing common project is all about.

But – and this seems quite important to me – from Frank’s as from Cassirer’s point of view, it is not under all circumstances the case that science produces those critical capacities and may serve as a model of social and political advancement. Also science itself may be misunderstood as ”absolute knowledge” – by scientists themselves and by the so called public. Frank explicitly stated, that this is the case when science is taught

a) as a collection of facts (99 p.)
b) as specialised knowledge in strictly defined disciplines (p.69)
c) as an end in itself (11p.).

Frank was very much aware that these misunderstandings were quite common (see especially the second part of his book). And he believed that they presented a real menace to democray: they tend to ruin the critical capacity of scientific thought instead of building it up.

”If a student’s mind keeps strictly within the department of science and his language sticks strictly to the vernacular of his field, he will be an easy victim of dangerous slogans arising from other fields. You may easily tell a specialist in physics or chemistry: the expert in psychology has proved that mankind needs a certain form of government or church for its happiness. You can tell him that the experts in economics have proved that there must be starving people in order to keep the ecomonic wheels running. You can even tell an expert in a special science that the specialist in ethics have proved that everyone has to obey a certain type of authority, whatever crime this authority may order.
But if a student understands what it means in his own special field that a statement is ‚proved‘, he will easily learn to distinguish in general what can be proved and what cannot be proved. He will judge justly the claimed rights of self-appointed leaders to give orders. He will be critical when he hears that those orders are proved be well-established doctrines, like those of ethics od economics or theology.” (p.93)

Therefore science as such is not ”the most worthy of communities”: even highly qualified scientists may become ”easy victims of dangerous slogans” – and such slogans do not arise from politics alone, they may emerge from scientific fields as well. In Frank’s view, science develops its most worthy effects only if and only as far as scientists conceive of what they are doing in a specific way, namely not as collecting facts and proclaiming the truth to the public and to other disciplines, but as working on the integration of knowledge and the advancement

of semantics. And this is the point where philosophy of science comes into play, though not as an independent discipline or field. Philipp Frank conceived of philosophy of science as a dimension of scientific research and teaching, though a dimension which does not exist ”automatically”. The philosophical dimension of science can be neglected and destroyed – or, on the contrary, be developed intentionally. In 1951 Philipp Frank thought that this dimension was very much neglected, and I leave it up to you whether since then the situation has much changed to the better.

” Our educational system has frequently produced the student of science who becomes an ‘expert’ in a narrow field and remains completely ignorant of all other domains of life. He becomes one of the easiest victims of an impostor. Since in a democracy legislation and administration are based upon the judgement of the citizens, this type of specialist should not be encouraged.”(p.94)

When Frank asked for integration and unification of science he did not ask for an overall system or base, but for a specific type of teaching and practicing science. Philosophy of science should be taught, in Frank’s view, to all science students as an antidote against the ”absolutism” which science itself tends to produce. This tendency, Frank argued in Machian tradition, is embodied in traditional scientific concepts just as in the narrow borders of academic disciplines[11] - and it has to be overcome by scientists themselves, not by philosophers who think of themselves as experts in “examining the presuppositions of science”. When Frank criticised “the advocates of philosophy as an ‘examiner of presuppositions’” (p.65), his main crticism was that their way of conceiving the integration of knowledge was in fact “just one instrument of disintegration of our educational system”(p.66) and deeply counterproductive to all efforts aiming at surmounting the narrow borders of specialised knowledge.

“The schools of thought which like to draw a sharp demarcation line between science and philosophy agree mostly at the following points: Each special science has to carry on its special job as thoroughly as possible without looking at the neighbour on the right or on the left. The worker in a special science has to collect ‘facts’ without venturing an interpretation. If all the special sciences carried on their ‘fact-finding-mission’ carefully and thoroughly, the man trained in philosophy could take the stage and give an ‘interpretation of the facts’ that would provide the integration of knowledge for which we are looking....
This may sound very nice to a great many ears. But to put this blueprint into practice would have a devastating effect on the development of a coherent system of science.” (67p.)

An epistemological project with political implications

May be that this crude philosophical image of the special sciences’ “fact-finding-mission” looks quite outdated nowadays (at least to the philosophy of science community). But there

11 See Thomas E.Uebel 1996

are a few points which even in our post-kuhnian age do not go without saying.
First this critique was not put forward in an antipositivist perspective, but on behalf of the Unified Science movement's radical positivism. Note second, that, remarkably enough, Frank pointed at the traditional philosophy's deep complicity in the "fact-finding" image of science. Especially German speaking philosophers, from the 19th century up to the Frankfurt School, in a way celebrated this image and the corresponding idea of philosophy's "super-scientific" (p.66) integrative function. Frank emphasized that the cultural and political dangers this ideological image of science brings about, are threatening the development of democracy in western postwar societies. "Since in a democracy legislation and administration are based upon the judgement of the citizens, this type of specialist should not be encouraged." This leads us to the third and, in my view, most interesting aspect of Frank's considerations.

When Frank stressed that philosophy should be taught to all science students and be practiced as a dimension of science itself, there was more at stake than the notorious quarrels about institutionalized disciplinary borders. Frank's vision was that philosophy of science should provide the intellectual instruments that would enable scientists to articulate and reflect on the leading principles of their own practice, i.e. to take "reflective responsibility" for their cognitive norms. It is true that traditional philosophy had tried to do exactly this,[12] and in this sense it was really philosophy what Frank demanded to be taught to science students. But it is obvious that teaching people to take reflective distance from the leading norms of their own practice and ask themselves how these norms are justified, means more than distributing philosophical doctrines among them. It means teaching them to think about science as the social practice they are involved in and the guiding principles of which are only partly explicit and clear.
That these principles cannot be made clear once and for all, was the lesson scientists and philosophers of science had been learning from the 19th century on. The modern philosophical doctrines Frank was referring to (holism, pragmatism, operationalism, logical empiricism...), tried to show how the philosophical enterprise of taking reflective responsibility for our cognitive norms could go on under these new "relativised" historical circumstances.[13] The Unified Science movement - especially its most active proponents Frank and Neurath - tried to give a specific turn to the new philosophical enterprise. They took very seriously that science was a social practice whose norms are given neither by nature nor by reason and cannot be settled once and for all. But they also took very seriously that norms - since they do not exist independently from the practices they are shaping - owe their binding

12 See Michael Friedman 1998
13 Friedman 1998, 1999

force to the belief of the acting individuals. In this sense, norms can be investigated only by the "practitioner" him- or herself: only she or he is in the position to doubt what she or he has believed, and to fix a new guiding idea, a new belief. This so to speak privileged position of the practitioners, being the only ones able to doubt their guiding beliefs, is at the same time the position of being unable to question all of them.[14] In his famous essay "The fixation of belief" C. S. Peirce argued that the radical doubt Descartes has introduced into philosophy, is no real doubt at all since it does not affect our practice. Long before Wittgenstein, Peirce described doubting our beliefs as a painful experience of practical confusion and disorientation, a situation where we do not know how to go on and which we normally try to overcome as fast as possible. In this sense, science - as any human practice - contains unavoidably a conservative moment.[15] Any successful practice reproduces and reinforces its guiding assumptions. As long as these assumptions are leading our practice in a successful way, there is no inner necessity of questioning them, even the possibility of doing so effectively is much more limited than some philosophers believed.

"Some philosophers have imagined that to start an inquiry it was only necessary to utter a question or set it down upon paper, and have even recommended us to begin our studies with questioning everything! But the mere putting of a proposition into interrogative form does not stimulate the mind to any struggle after belief. There must be a real lively doubt, and without this all discussion is idle."[16]

From this angle, Unified Science, as Frank and Neurath conceived it, would come to training scientists in having "real lively doubts" about the justification of what they are doing. As they shared the pragmatists' view that "real" doubts are practical doubts, i.e. doubts about how we should go on, they suggested to create the intellectual and social circumstances under which this type of questioning emerges and may proceed in a fruitful way. Integration of irreducibly pluralistic knowledge (remember Neurath's "Encyclopedia as a 'model'") was the intellectual framework of a practical movement which did not claim that it was based on any inner theoretical necessity. Frank and Neurath argued that the project was historically, socially and politically needed.[17] Thomas Uebel stressed several times that Neurath conceived "of science as a social practice whose form is determined by its practitioners,"[18] that he wanted scholars "consider themselves competent and even personally obliged to engage in the clarification of the concepts of their science and to take responsibility for these themselves."[19] In our context

14 See Alan Richardson in his contribution to this volume.
15 Auf diese tendenziell konservative Tendenz des Unternehmens Wissenschaft hat schon Neurath 1935 in seiner Kritik von Poppers *Logik der Forschung* verwiesen. Bei Kuhn ist sie bekanntlich ein strukturelles Moment der normalen Wissenschaft.
16 Peirce p. 248
17 For instance in Neurath 1935 a and b
18 Uebel 1996, p. 108
19 Uebel 1998, p. 429

we can see more clearly what this means - and we can see that the proponents of the Unified Science movement were aware of the far reaching philosophical challenge such a project has to meet.

As Frank and Neurath looked at it, Unified Science was an epistemological project and at the same time a political one. The aim of all those activities (the congresses, series of publication, the Encyclopedia) was not to collect scientific truths and pronounce them to the public, it was to lay bare the logical and empirical procedures by which scientists reach their conclusions. May be that nowadays this project could be re-appreciated from the point of view of the ”public” and the interest society should take in controlling the big business of producing scientific knowledge. Though this is an important dimension of the project indeed, we should not loose sight of one of its other dimensions: the project was to create a social space, a forum, where scientists *themselves* would be urged to acquire the competence of conceiving their basic epistemological assumptions as leading *practical* principles which are only partly explicit and clear. Scientists would have to learn that they themselves are responsible for the type of progress Frank called ”advancement of semantics”.

Note that this does not mean that scientists are in the position to choose arbitrarily any epistemological framework they (or their communities) prefere. As ”practitioners” they are not in the distanced position of relativist philosophy or Sociology of Scientific Knowledge.[20] Claiming that scholars are obliged to take responsibilty for their leading notions in this sense means that the responsibility has to be taken ”from within” their practice. In science, as in any other human practice, ”advancements of semantics” are achieved at only on the condition that individuals and groups are capable of questioning their own leading norms ”from within”; that they are prepared (and know how) to ”relativise” the intellectual framework their actual practice is depending on - and to create a more complex language, rich enough to integrate experiences that had been expressed in different languages. The ”unified language” as Frank and Neurath conceived it, was neither the comprehensive, once and for all correctly constructed scientific language nor the language of physics.[21] It was the ”richer language” that is needed every time the linguistic framework we are successfully working with has been challenged by some incompatible experience. The project of Unified Science was a political

20 Michael Friedman, 1998, analysed "the tension between the internal norms .. governing the practice of science, on the one hand, and the distanced, external conclusions of skeptical and relativist philosophy, on the other" (p.268) in a very illuminating way. Unified Science, in my view, was a project which tried to deal with this tension in a different way than the Hume-Carnap-Wittgenstein tradition, characterized by Friedman (1998) in the following way: For them "we insulate the practice of science from the corrosive effects of skeptical and relativistic philosophy ... by sharply segregating philosophy, as a discipline, from the scientific enterprise."(p.269)

21 See Mormann 1996, 1999

effort to organize the social circumstances under which "lively problems", calling for a ”richer language” that relates different zones of empirical knowledge to each other would occur much more often than within the established disciplinary and cultural borders.

As I understand the project, it claims also that scientists should learn to think about their leading notions as norms whose justification cannot be explicated without putting them into relation to the normative principles in other spheres of human practice (including other disciplines). ”Relativising” cognitive norms in this sense does not mean trying to justify them from an ”outside” point of view (for instance in social, political ... perspectives), but it means creating an intellectual and linguistic framework (and also a social and cultural space) in which we can make clear that taking responsibility for our cognitive norms is only one dimension within the much broader project of taking responsibility for our human practices.

Therefore, training science students in taking reflective distance from the leading norms of their own practice and ask themselves how these norms are justified, is not only an intellectual enterprise. In *Relativity – a richer truth* Frank conceived of it as a cultural project with far reaching social, political and even moral implications. From his angle, science as a zone of social practice could *become* one of the avant-gardes of modern society only if scientists learned to see that even within science certain advancements are not achieved at by the *community of falsifiers'* immanent dynamics, but by deliberate individual and collective efforts, which in a certain sense are also moral (and political) ones. The challenge that scientists should learn to take the intellectual framework even of a successful scientific practic not for granted, demands from institutions that they encourage and gratify the risky crossing of disciplinary, social and cultural borders. And it demands from individuals that they deliberately (i.e. even without being forced by any inner theoretical necessity or extern social constraints) accept the burden of describing and trying to justify their leading norms in a broader framework than they have been used to.

At this point we see more clearly why Frank believed that science, taught and practised in this specific way, might even strengthen the belief in the validity of values. It can be experienced and habitualized as a form of social practice which enables us to reformulate not only theoretical but also moral claims in a changing world. And we can see what philosophy of science could contribute to the public vision of what the pluridimensional cultural project is all about. It could intervene in the public discourse by demonstrating that the capacity for integrating new experiences into any social practice is determined at least by three factors: first by the willingness of the acting people to analyse the logical framework of their claims

and to define the meaning of concepts by their ”observable consequences”;
second by the constructive power which is needed for the creation of a new, an enriched language, capable of describing ”a new stock of facts”;
third by the preparedness of people to ”relativise” their own standpoint in order to contribute to the enrichment of our experience.

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